

NASA Explorer Schools FY 2007 Annual Summary Report

The NASA Explorer School (NES) Project was implemented in 2003 in response to a documented need to help schools better inspire, engage, and educate students in grades 4-9 in Science, Technology, Engineering, and Mathematics (STEM) content. NES leverages unique mission content, technologies, partnerships, and personnel to provide professional development opportunities to educators and NASA unique learning opportunities for students. The Project establishes a three-year partnership between NASA and a participating school to provide students and teachers with tools, experiences, and opportunities that further advance STEM education via NASA expertise and resources. The Project focuses on working with teachers who work with populations traditionally underserved by NASA and historically underrepresented in STEM professions.

NES Participants in FY 2007

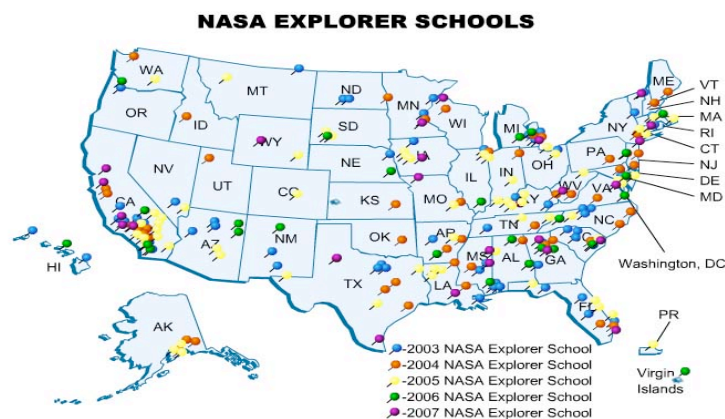
25 NES partnerships, serving a total of 30 schools, were established in 2007. 175 applicants from across the country were reviewed through a competitive two-tiered process involving center staff and a national review board. Applications were completed online from Oct. 2006-Jan. 31, 2007.

Cohort Year	Number of NES Sites	Number of Schools	Percent of NES Schools Considered High Poverty*	Percent of NES Schools Considered High Minority*	Number of Students Served	Number of Educators Served
2003	49	61	76	76	34976	1409
2004	51	68	82	75	44707	1801
2005	50	57	98	82	42066	2015
2006	25	33	91	70	15639	1588
2007	25	30	88	80	16452	1142
Total Served in FY07	200	249	87	77	153,840	7,955

Note: Blue text represents alumni NES that have completed the initial three-year partnership with NASA, Red text represents current NES.

*Greater than 50% of students eligible to received free or reduced lunch indicated high poverty; Greater than 50% minority student population indicated high minority.

NES are located in all 50 States, Puerto Rico, and the Virgin Islands.



As an Agency-wide educational project, NES relies on the support of all ten NASA Centers to implement the project. In addition to the national professional development and student opportunities, each Center is responsible for providing day-to-day support to NES in their geographic region, to assist with action plan development and implementation.

Center	Cohort Year					Alumni NES	Current NES
	2003	2004	2005	2006	2007		
ARC	5	6	5	3	2	11	10
DFRC	5	0	5	2	2	5	9
GRC	5	6	6	3	3	11	12
GSFC	5	8	6	3	3	13	12
JPL	4	5	5	1	2	9	8
JSC	5	6	6	3	2	11	11
KSC	5	5	5	3	3	10	11
LaRC	5	6	6	3	4	11	13
MSFC	5	7	5	3	3	12	11
SSC	5	2	1	1	1	7	3
Total	49	51	50	25	25	100	100

Overall Project Highlights

NES Project Transition from HQ to GRC in FY 2007

The NES Project completed transition of management from HQ to GRC in FY07.

- Transitioned Support Service Contractor staff from HQ to GRC
- Maintained level of service to schools with no interruption or delays during NES transition to GRC
- Modified NES Evaluation Plan to address OMB and PART measures
- Responded to 40% reduction in project funding
- Developed a new application process to select schools most appropriate for the project
- Piloted first NASA Education Rigorous Evaluation
- Completed necessary documentation for PRA/PIA of NES application
- Developed a new partnership and sustainability plan that directly impacts all NES schools
 - Developed self-assessment tools, sustainability action plan, and best practice documents to guide schools in partnership development
- Created an NES Partnership and Sustainability Coordinator position to address partnership and alumni needs
- Developed a plan for NES Alumni Schools
- Rolled out a new NES mentor school effort, to better guide first year NES
- Developed a new Statement of Work for an NES Solicitation, negotiated bridge agreements to maintain services during the process

Impacts of 2007 Budget Reductions

In FY 2007 the NES Project absorbed a 4.5 million dollar budget reduction. This reduction required re-scoping of project elements and limited NES ability to achieve agency goals in the following ways:

- Unable to support active NES in all 50 states
- Selected 25 new schools instead of projected 50

- Reduced project staff by 5 WYE
- Cancelled solicitation for new professional development opportunities
- Cancelled 5 summer content workshops
- Cancelled special opportunity professional development workshops dealing with remote sensing and oceans
- Cancelled support of NASSMC partnership and sustainability grants
- Cancelled the Student Symposium allowing NES to reach fewer students
- Reduced the scope of the Sustainability Workshop allowing NES to train fewer teachers
- Cancelled promotional video production work
- Reduced support for ad hoc committees that allow us to better understand the needs of populations served by NES
- Reduced support of DLN at field Centers limiting scientist support and new equipment
- Reduced travel for special opportunity workshops limiting the number of teachers involved

Brief Overview of Evaluation Findings

Findings by NES Goal with Performance Objectives, OMB, PAR and PART measures

Outcome II (Elementary and Secondary Education -- Educate and Engage): *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.*

NES Goal 1: Provide educators with sustained professional development, unique STEM based teaching and collaborative tools, digital content resources, and compelling NASA contextual-based teaching applications that align with National Standards for targeted content areas.

NES Performance Objectives:

- Increase participation and growth in STEM-G; and
- Increase technology use

Objective 2.1: **Short Duration Professional Development (less than 2 days)** (Engage) Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.

Data Sources:

- Teaching, Learning and Computing Survey,
- Administrator Questionnaire,
- Teacher Involvement Questionnaire,
- NSTA records,
- Team Lead Questionnaire,
- Professional Development Workshop Questionnaire,
- eFolio entries

OMB Output Measures	NES FY07 Data
<p>2.1.1 Number of elementary and secondary educators participating in NASA-sponsored short-term professional development opportunities (PAR PART)</p>	<ul style="list-style-type: none"> • The percentage of teachers reporting attending short-duration professional development in the past year increased significantly from 56 to 72 percent (Teacher survey July 2007 p.59). • Based on the number of teachers surveyed, this represents an increase from 491 to 1,100 teachers. In other words, during the 2006-07 school year, 1,100 teachers surveyed reported attending short duration professional development. Number of NES schools participating in conference opportunities: 67% of NES schools (84 teams) sent a teacher or administrator to conferences offered by NCGE, NIEA, NSTA, ITEA, NCTM, NAESP and NECC (NSTA August 2007) • Number of conference opportunities for participants: 77 team members, 165 non-team members and 14 administrators attended conferences (NSTA August 2007)
OMB Outcome Measures	NES FY07 Data
<p>2.1.2 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom (PAR PART)</p>	<ul style="list-style-type: none"> • Approximately 61 percent of the professional development activities resulted in some form of implementation in the school such as the creation of a STEM-G after school club. (eFolio July 2007 p. 9) • From the fall to the spring, there was a statistically significant increase in the number of hours that teachers were spending using NASA resources. Most of the results came from the shift of individuals from not using NASA resources and materials to using them for 1-5 hours with an increase of 13% from fall to spring. (Teacher survey July 2007, p. 54) • In the fall, about 44 percent of teachers reported using technology in the classroom during the last year "Quite a bit" or "A lot." In the spring, this same figure was 51 percent, representing a statistically significant change. Teachers also became more active in implementing technology, information on STEM-G careers, and inquiry in the classroom. (Teacher survey July 2007 p. 64) • From the fall to the spring, there was a statistically significant shift increase in the number of hours of school-wide activities focused on STEM-G activities. (Teacher survey July 2007 p. 55). • The change was predominantly from shifts among the newer cohort teachers, and we find the longer that schools remain in NES, the more likely they are to report having spent 15 or more hours conducting school-wide STEM-G activities. (Teacher survey July 2007 p. 55) • On average, 15 teachers/school in NES schools are using NASA materials, according to team leads (Team Lead Survey July p. 132) • From the fall to the spring, there was a statistically significant increase in the number of hours teachers used NASA resources and the number of STEM-G activities

	<p>(Teacher survey July 2007, p. 54-56)</p> <ul style="list-style-type: none"> • Use of NASA resources increases significantly with years in the project (Teacher survey July 2007 p. 56) • More 4-6th grade students report using NASA materials in the spring either "Every week" or "Every day" for most of the subjects. It is also interesting to note that more students report using NASA resources outside of school in the spring (31 percent versus 23 percent). (Student Survey July 2007 p. 93)
2.1.3 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom who rate the resources as effective	<ul style="list-style-type: none"> • Teachers who attended some short duration professional development were significantly more likely to integrate information on STEM-G careers classroom than other teachers. (Teacher survey July 2007 p. 66) • Sixty-seven percent of team leads report their NES teams are "Very" or "Extremely" satisfied with the use of NASA products. An additional 24 percent are "Satisfied" (Team Lead Survey July p. 130)
2.1.4 Number of formal partnerships with professional development associations	<ul style="list-style-type: none"> • Oklahoma State University • National Science Teachers Association • Collaborative for Higher Education • CisLunar Aerospace • West Liberty State College • GLOBE • Center of Image Processing • GEMS – Lawrence Hall of Science

Objective 2.2:

Long Duration Professional Development (more than 2 days)

(Educate) Provide long-duration and/or sustained professional development training opportunities to educators that result in deeper content understanding and/or competence and confidence in teaching STEM disciplines.

This section reports results for professional development of more than two days. These include the special opportunities offered during the year (Reduced Gravity Flight Opportunity, GEMS workshop, Launch Quest Opportunity, NES Leadership Academy at LaRC, Winter Story Opportunity) and the summer workshops (orientation workshops, content workshops (Technology Immersion, Human Space Flight, How NASA Applies Mathematics, VISIONES, Robotics) and the sustainability conference).

OMB Output Measures	NES FY07 Data
2.2.1 Number of elementary and secondary educators participating in NASA-sponsored professional development opportunities.	<ul style="list-style-type: none"> • 256 educators attended conferences including 14 administrators, 77 team members and 165 non-team members. (NSTA, July 07 p. 19) • 473 NES adults participated in 19 different long duration professional development opportunities; 221 team members, 100 non-team members, 88 team leads, 57 administrators and 7 informal educators, from 122 teams and 138 schools (NSTA July 2007 p. 19)
2.2.2 Number of colleges and	<ul style="list-style-type: none"> • NES schools reported partnerships by activity in their

universities training elementary and secondary educators who partner with NASA in their STEM teacher educator programs.	<p>eFolios;</p> <ul style="list-style-type: none"> • 22 different colleges/universities were listed (9% of 235 partnerships). In addition other partners listed were: 11 clubs such as 4H, 16 government groups such as NOAA or the FAA, 67 businesses (29%), 40 museums or science centers, 40 other educational projects, 5 foundations, 10 individual community members, 5 other schools, 18 professional organizations and 1 listed other grades. (eFolio, July 2007 p. 24)
OMB Outcome Measures	NES FY07 Data
2.2.3 Number of teachers who use NASA content or resources as a result of another teacher's direct involvement with a NASA program.	<ul style="list-style-type: none"> • From the fall to the spring, there was a statistically significant increase in the percent of teachers who were training other teachers from 31 to 37 percent. The median number of other teachers trained was eight while the average was around 24. • Fifteen teachers reported training over 100 teachers. In the spring, 45 percent of teachers reported being trained by other teachers. (Teacher survey July 2007, p. 56) • Orientation workshop - About 46 percent of teachers reported that they attended the conference as a result of another educator. Eighty-six percent reported that they planned to share what they learned with other teachers from their school. (NEEIS summer workshop survey August 2007 p. 14) • About 1/3 attended the sustainability conference because of another educator. (Sustainability survey August 2007 p. 39) • About 25 percent of administrators reported that at least monthly, use of the NES strategic plan at their school had led the <i>district</i> to change a policy. About 46 percent of administrators reported that the NES strategic plan had influenced <i>school</i> policies at least monthly. (Administrator survey July 2007 p. 54) • Administrators became involved in supporting teachers' NASA involvement. Across the cohorts, between 66 and 71 percent of administrators were encouraging teachers at least monthly to use NASA resources. Almost 30 percent of administrators from each cohort reported that they encouraged teachers weekly to use NASA resources. (Administrator Survey July 2007 p. 51)
2.2.4 Percentage of NASA teacher program participants who become active within a national network to train other teachers.	<ul style="list-style-type: none"> • NES team members are responsible for involving their faculties in NASA activities. Data presented for other indicators show most of the active schools are successful in doing this. NES team members and other faculty are also eligible to attend national workshops where they interact with teachers from other regions.
2.2.5 Percentage of elementary and secondary educators who participate in NASA training programs who use NASA	<ul style="list-style-type: none"> • Increased levels of long duration professional development lead to statistically significant differences in the integration of technology, information on STEM-G careers, and the use of inquiry in teachers' teaching. (Teacher survey July 2007 p. 66)

<p>resources in their classroom instruction. (PAR PART)</p>	<ul style="list-style-type: none"> • From the fall to the spring, there was a statistically significant increase in the number of hours teachers used NASA resources and the number of STEM-G activities (Teacher survey July 2007, p. 54-56) • Use of NASA resources increases significantly with years in the project (Teacher survey July 2007 p. 56) • More 4-6th grade students report using NASA materials in the spring either "Every week" or "Every day" for most of the subjects. It is also interesting to note that more students report using NASA resources outside of school in the spring (31 percent versus 23 percent). (Student Survey July 2007 p. 93) • Over 85 percent of teachers attending the summer orientation workshops reported that there would be a "great" impact on integrating technology, in teaching students about STEM-G topics, and in inspiring students. Around 70 percent responded similarly in terms the impact on using technology and on increasing family involvement. In each area, over 97 percent of teachers claimed that the program would have "some" or "great" impact on students. (NEEIS summer workshop survey August 2007 p. 14) • At the technology immersion workshop, as well as the other content workshops, the responses were overwhelmingly positive. Teachers reported high levels of satisfaction and greater awareness of NASA and its educational resources. Teachers predicted significant impact on their teaching as a result. (NEEIS summer workshop survey August 2007 p. 17)
<p>2.2.6 Evidence that teachers who use NASA resources perceive themselves as more effective teachers in achieving STEM results with their students.</p>	<ul style="list-style-type: none"> • Teachers report that the NASA connection was very important to the success of the activities reported in their eFolios (4.5/5) (eFolio July 2007 p. 14) • Participants were highly satisfied with their experiences at orientation and content workshops and the sustainability conference in the summer of 2007 as indicated by statistically significant changes in participants' knowledge of NASA's mission, their awareness of NASA resources and their understanding of NASA's support for education at all workshops. We also observed statistically significant increases in participants' confidence in their ability to use NASA as a context for teaching STEM-G. (NEEIS workshop survey August 2007 p. 6) • The increase in comfort level is significant for teachers teaching science, educational technology and robotics when we compare teachers with less than 16 hours of professional development to those with more. (Teacher survey July 2007 p. 64) • We find that increased levels of long duration professional development lead to statistically significant differences in the integration of technology, information on STEM-G careers, and the use of inquiry in teachers' teaching plans. Teachers who had no long duration professional development posted small gains in reports on their practice in the fall and spring.

	<p>while the teachers who had some long duration professional development had statistically significant gains ranging from 0.4 to 0.9. Gains for individuals with more than 16 hours of long professional development were even greater and were always statistically significant. (Teacher survey July 2007 p. 66)</p> <ul style="list-style-type: none"> • In the full sample of teacher surveys as well as a matched pairs sample, we find the proportion of teachers reporting that they were not at all comfortable teaching in each STEM-G subject fell dramatically. (Teacher survey July 2007 p. 62) • Over 95 percent of teachers attending orientation workshops reported that they were better prepared to integrate technology in their classroom. Over 98 percent of teachers reported that they were better prepared to interest students in STEM-G careers and topics now, and over 98 percent of teachers reported that they were better prepared to help students learn about STEM-G using NASA resources. (NEEIS workshop survey August 2007 p. 13) • Teachers attending special opportunity Winter Story workshop report that was effective in improving their ability to teach STEM-G topics and to inspire students. Participants at the Reduced Gravity Workshop acquired skills and knowledge, including a better understanding of NASA careers and NASA's support of education (Workshop survey April 2007 p. 5) • Team leads were asked to report the extent of usefulness of workshops. Nearly sixty-three percent of team leads felt the orientation workshop was useful to the whole school while an additional 19.6 percent felt it was useful to teachers who did not even attend. Fifty-four percent of team leads felt the content workshops were useful to the whole and the sustainability workshops was useful to the whole school (Team lead survey July p. 133) • As a result of participating in the orientation workshops, administrators reported statistically significant increases in their knowledge of NASA, NES and their level of preparedness for supporting the integration of technology and developing students' interests, knowledge and career aspirations in STEM. (NEEIS workshop survey August 2007 p. 16) • Administrators were extremely positive about the quality of the training at the Leadership Academy, reporting the training would help motivate students more effectively to pursue STEM-G topics and careers and would also help them increase parental involvement in their children's educations. (Leadership content workshop April 2007 p. 5)
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Objective 2.3:

Curricular Support Resources

(Educate) Provide curricular support resources that use NAS themes and content to:

- a) Enhance student skills and proficiency in STEM disciplines (Educate),
- b) Inform students about STEM career opportunities (Engage), and
- c) Communicate information about NASA

This section reports the results for the use of resources as reported by teachers, students and administrators in surveys, and from the eFolio.

OMB Output Measures	NES FY07 Data
<p>2.3.1 Quantity, type, & cost of educational resources being produced</p> <p>2.3.2 Quantity, type, & cost of educational resources approved through the NASA education product review process.</p>	<ul style="list-style-type: none"> • 1,062= number of times NASA resources were used; \$186=average cost; 0-\$15k= Resource cost range (eFolio, July 07 p.13) • Between Oct 2006 and the end of March 2007 AESs distributed an average of 10.9 materials (range-0-400) and demoed 1.7 materials (range 0-50) at student programs. (AES Student Program reports April 2007 p. 28) • There was a significant increase in the number of hours that teachers reported spending using NASA resources from fall to spring. When we examine the results by cohort, we find statistically significant differences that provide evidence that time in the program is positively related to increased usage. (Teacher survey July 2007 p. 56) • In the case study interviews in the spring , we heard again and again that the most valuable aspect of the project was the people and the prestige that come with the relationship, not the stipend. (Case study interviews August 2007 p. 62)
<p>2.3.3 Number of approved materials that are electronically accessible</p>	<ul style="list-style-type: none"> • 125 activities involved DLN events (eFolio July 2007 p.13) • Weekly eBlast to all NES schools provides links to NASA resources.
OMB Outcome Measures	NES FY07 Data
<p>2.3.4 Customer satisfaction data regarding relevance of NASA educational resources.</p>	<ul style="list-style-type: none"> • In the eFolio teachers reported on the importance and type of NASA resources. When asked, "How important was the NASA connection to the success of PD activities?" the mean was 4.66/5. Resources identified were NASA materials (44), AES (36), funding (29), NESC (17), DLN (14). (eFolio July 2007: p. 17-18). • Based on 82 percent of 4-6th grade students in the spring reporting that they prefer to use NASA resources to learn, it is clear that students are excited about the materials they are being exposed to from NASA... (Student Survey July 2007 p. 93) • 72 percent of 7-9th grade students reported that they preferred NASA materials. (Student Survey July 2007 p. 110)
<p>2.3.5 Customer satisfaction data regarding effectiveness of NASA educational resources.</p>	<ul style="list-style-type: none"> • Teachers reported that NASA PD activities were an effective way to learn (4.6/5) (eFolio July 2007: p.19) and that the overall the activities were successful (4.6/5) (eFolio July 2007: p.20) • In the eFolio, schools reported planning to use NASA resources 1,036 times by October 2006 with an increase to

	<p>2,069 by May 2007. 1,062 activities were completed using NASA resources¹. (eFolio results July 2007 p. 13)</p> <ul style="list-style-type: none"> • In the eFolio questionnaire for all completed activities, teachers reported that it is very likely that the student activities will become part of the regular curriculum over time with a mean rating of 4.4/5. (eFolio July 2007: p.29) • Nearly 89 percent of team leads feel that all or most of their expectations about support the school should receive from NASA were met. (Team lead survey July p. 131)
2.3.6 Use of technology to improve data collection, reporting strategies and dissemination	<ul style="list-style-type: none"> • Teachers report above average technical skill with a variety of technologies (3.52-3.78/5) and constructivist teaching philosophy (3.45-3.58/5), and constructivist use of technology ranging from 2.02-2.27/5. (TLC July 2007 p. 127) • In the fall, about 44 percent of teachers reported using technology in the classroom during the last year "Quite a bit" or "A lot." In the spring, this same figure was 51 percent, representing a statistically significant change. (Teacher survey July 2007 p. 64) • 125 schools used the eFolio to plan and report data on their NASA-related activities.

NES Goal 2: Provide all students the opportunity to explore STEM-G topics in a variety of engaging and interactive NASA contexts.

NES Performance Objectives:

- Increase student interest and participation;
- Increase student knowledge about careers; and
- Increase student ability to apply STEM-G

Objective 2.4: **Student Involvement K-12**
(Engage) Provide K-12 students with authentic first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers.

Data Sources:

- Student Interest surveys (grades 4-6, 7-9);
- Teacher involvement survey;
- eFolio entries; and
- Case studies.

OMB Output Measures	NES FY07 Data
2.4.1 Number of elementary and secondary student participants in NASA instructional and enrichment activities	<ul style="list-style-type: none"> • There were 60 classroom visits in 53 unique schools in 9 NASA field Centers that were reported on in the eFolio questionnaires involving students 13,556 times and teachers 789 times (eFolio, July 2007 p.24) • Student club related activities occurred in 30 schools in 10

2.4.2 Number of elementary and secondary student participants in NASA sponsored extended learning opportunities	<p>centers with 1332 students participating (eFolio July 07 p.26)</p> <ul style="list-style-type: none"> Between Oct 06 and March 30, 2007 AES report reaching 9,351 K-4th graders, 25,743 5-8th grader, and 2,881 9-12th graders. (AES Student Program reports April 2007 p.29) From the fall to the spring, there was a statistically significant shift increase in the number of hours of school-wide activities focused on STEM-G activities (Teacher survey July 2006 p.55)
2.4.3 Number of opportunities for family involvement	See Goal 3: Family Involvement
2.4.4 Percentage increase in number of elementary and secondary student participants in NASA instructional and enrichment activities. (PAR PART)	<ul style="list-style-type: none"> From fall to spring we observe an increase in the numbers of students planned activities intend to reach. Planning in eFolio was as follows: # times K-4 students were to participate in activities went from 48,890 in October 2006 to 82,060 in May 2007; # times 5-8 students were suppose to participate rose from 73,751 to 143,199; # times 9-12 students were suppose to participate rose from 10,402 to 18,966. (eFolio July 2007 p. 13) Completed activities involved 52,978 K-4 students, 89,870 5-8 students and 11,973 9-12 students². (eFolio July 2007 p. 13)
OMB Outcome Measures	NES FY07 Data
2.4.5 Activities and investigations result in increased student interest in STEM	<ul style="list-style-type: none"> 247 activities with student investigations were completed by schools (eFolio July 2007 p.13) AES report having students develop products. Physical models were the most frequently developed product (141) followed by journals/lab workbooks (57) and reports (46). (AES student program reports April 2007 p. 34) Teachers reported positive changes in their eFolio questionnaires as a result of NES activities: "This activity was engaging to my students." 4.72/5. "This activity will lead to more involvement by the participants (students, teachers, families and/or community." 4.55/5 "This activity was inspirational to the participants." 4.62/5. (eFolio, July 2007 p. 28-9)
2.4.6 Activities and investigations result in increased student knowledge about careers in STEM	<ul style="list-style-type: none"> As a result of participation in NES, students are exposed to career related activities throughout the K-12 pipeline (eFolio July 2007 p.11) We observe a significant, positive change in awareness of NASA careers in 4-6th graders (Student Survey, July 2007 p. 90) Seventy-four percent of team leads report achieving at least moderate success in helping students develop STEM-G career plans (Team Lead Survey July p. 134) Understanding of NASA mission and vision - More 4-6th grade students report knowing "A lot" about NASA at the end of the year. (Student Survey July 2007 p. 91)
2.4.7 Family participants will	See Goal 3: Family Involvement

show an increased interest in their student's STEM coursework	
2.4.8 Level of student learning about science and technology resulting from elementary and secondary NASA education programs.	<ul style="list-style-type: none"> Teachers reporting on 913 activities in the eFolio questionnaire rated the statement "This was an effective way to learn" 4.67/5. (eFolio July 2007 p. 20) Student survey pre/post results did not show changes in STEM knowledge in a pilot RCT study (Randomized Control Trials Presentation August 2007). Case study interviews suggest that some teachers believe the NES project is having a positive impact on student knowledge, which may translate into higher test scores. 50.5 percent of team leads report being "Very" or "Extremely" successful in developing student application of STEM-G knowledge (Team Lead Survey July p. 134)
2.4.9 Level of student interest in science and technology careers resulting from elementary and secondary NASA education programs.	<ul style="list-style-type: none"> Data from the eFolio indicate participation by students 4,942 times in STEM-G career focused activities. (eFolio, July 2007 p. 25) Data from eFolio questionnaires about completed activities indicate a positive effect on student engagement (4.5/5), future involvement (4.5/5) and inspiration (4.5/5). (eFolio, July 2007 p.29-30) For math, more 4-6th grade students reported that they "like a lot" or "usually like" in the spring than the fall. (Student Survey July 2007 p. 76) For science, more 4-6th graders reported they "like a lot" in the spring than the fall. (Student Survey July 2007 p. 77) Nearly 55 percent of team leads report being "Very" or "Extremely" successful at developing student interest in STEM-G topics (Team Lead Survey July p. 134) For using tools and observing, more 4-6th graders reported they "like a lot" in the spring than in the fall. (Student Survey July 2007 p. 80) While there were no significant changes overall in interest in jobs in any of the areas 4-6th students were asked about, we did observe more students reporting "Like a lot" in the spring in each of the STEM-G areas. This was not the case with language arts, providing some suggestive evidence that students may have more interest in STEM-G careers after a year in the NES program. (Student Survey July 2007 p. 84) We observe a significant, positive change in awareness of NASA careers by 4-6th graders which is encouraging for NES since increasing student knowledge is an important step towards increasing student interest. However, we do not see any other significant changes overall in students' awareness of NASA activities. (Student Survey July 2007 p. 90) We observe a significant positive change in interest in 7-9th graders, including science, engineering and math. More students reported "Like a lot" in the spring in every category. Interest in all other STEM-G areas increased as well, but the change was not significant. In general, the percentage of

	students reporting "Not at all" interested declined as well. (Student Survey July 07 p. 104)
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NES Goal 3: Build strong family involvement within NES schools.

NES Performance

Objective:

- Increase family involvement in children's learning

Objective 2.4: **Student Involvement K-12 (focus on Family Involvement)**

Data Sources:

- Student Interest surveys (grades 4-6, 7-9),
- Teacher Involvement Survey,
- eFolio entries,
- Case study interview
- AES student program reports.

OMB Output Measures	NES FY07 Data
2.4.3 Number of opportunities for family involvement	<ul style="list-style-type: none"> • According to team leads, only 5.2 percent of schools did not offer any STEM-G activities for families. Sixty-six percent offer 1-3 activities while 21 percent offer 4-6. Activities offered to families focus on stimulating conversation with their children. (Team lead survey July p. 135-136) • Most family events, such as family nights, seem to be offered between 1 and 3 times a year. (Team Lead survey July 2007 p. 136) • Data from the eFolio questionnaires indicate participation by families 17,582 times in STEM-G NASA activities. (eFolio July 2007 p. 13) • Between October 2006 and March 30, 2007, AES report 1,190 parents participated in AES student programs. (AES Student program reports April 2007 p. 29) • Eighty schools reported on 149 activities designed to increase family involvement in STEM-G with their children. (eFolio, July 2007, p. 31) • Our spring survey revealed that about 70 percent of teachers surveyed (1,070) attended a family activity aimed at STEM-G and 71 percent had invited parents to the classroom in the last year. In less formal ways, teachers were working with families through assigning homework (59 percent), responding to parental

	<p>questions (50 percent), and providing resources to families (56 percent). These results suggest that teachers were attempting to interact with families through formal and informal ways. (Teacher survey July 2007 p.71)</p> <ul style="list-style-type: none"> • When we examine teacher reports of after school parental interaction, we find greater incidences of parental involvement as reported by teachers in the spring as compared to the fall. These statistically significant differences in parent participation occur in such activities as doing homework together, watching science shows together, talking about current events in science, attending school events, going to STEM-G activities (e.g. a science museum), buying science magazines, or talking about science. (Teacher survey July 2007 p. 74)
OMB Outcome Measures	NES FY07 Data
2.4.7 Family participants will show an increased interest in their student's STEM coursework	<ul style="list-style-type: none"> • We observed a significant increase the frequency of 7-9th graders and their families attending places with math and science such as museums (Student Survey July 2007 p. 101) • When we compare teachers over the course of a year, we find more teachers by the end of the year are encouraging parental involvement and reporting higher levels of parental involvement than previously. (Teacher survey July 2006, p. 69) • Data from the eFolio questionnaire suggest that family activities were seen to have value and be effective. The mean score was a 4.7/5 in response to the statement "I would do this activity again." (eFolio July 2007 p. 32). • The mean score was 4.6 to the statement "This activity will lead to more involvement by the participants (students, teachers, families and/or community.)" and the mean score was 4.4/5 for "The NASA connection was important to the success of this activity." (eFolio July 2007 p. 33) • Sixty percent of team leads report that they are satisfied, very satisfied for extremely satisfied with the family involvement component of NES. (Team Lead survey July 2007 p. 131)

NES Professional Development Opportunities

An essential cornerstone of the NASA Explorer Schools Project is teacher professional development. It is essential that NES teachers become comfortable and confident in the delivery of STEM content to their students. NES delivers long and short duration professional development to teachers and administrators in the following ways:

1. **Aerospace Education Services Project** - NASA Aerospace Education Specialists (AES) provide in-school professional development, workshops, lesson plan modeling, and

training on NASA content, products and resources to NES teachers. They work with teachers to develop and implement an action plan that integrates NASA content into all aspects of their school. Every NASA Explorer School has an AES that is familiar with their state and local education standards and helps NES teachers integrate NASA mission content into their lessons. AES also provide student assembly and classroom activities.

Service Provided By AES	Number of Events	Number of Participants
FY07 <u>Professional Development</u> Events provided at NES	113	3,530
FY07 <u>Student Events</u> (Classroom visits and Assemblies) provided at NES	586	31,912

2. **National and Regional Professional Development Conferences** - The NES project provides scholarships for teachers and administrators to attend National and Regional Professional Development Conferences sponsored by national education organizations across the country. These conferences showcase current educational technologies, best teaching practices, and innovative pedagogical approaches and technology tools in a variety of STEM areas. In FY 2006 NES teachers and administrators attended the following conferences.

Professional Educational Association Conference	Number of NES Participants
National Council for Geographic Education (NCGE) , Lake Tahoe, NV October 5-8, 2006	19
National Indian Education Association (NIEA) , Anchorage, AK October 19-22, 2006	7
National Science Teachers Association (NSTA) , Omaha, NE October 19-21, 2006	3
National Middle School Association (NMSA) , Nashville, TN November 2-4, 2006	28
National Science Teachers Association (NSTA) , Baltimore, MD November 2-4, 2006	26
National Science Teachers Association (NSTA) , Salt Lake City, UT December 7-9, 2006	40
International Technology Education Association (ITEA) , San Antonio, TX March 15-17, 2007	27
National Council of Teachers of Mathematics (NCTM) , Atlanta, GA March 21-24, 2007	56
National Science Teachers Association (NSTA) , St. Louis, MO	57

March 29-April 1, 2007	
National Association of Elementary School Principals (NAESP) , Seattle, WA March 29-April 2, 2007	6
National Educational Computing Conference (NECC) , Atlanta, GA June 24-27, 2007	16
Total NES Educators that participated in professional development conferences	285

3. **NES Symposia** were presented by the National Science Teachers Association (NSTA), in partnership with NASA, designed around STEM content, to further enhance the conference experience for NES educators. These symposia provided unique learning experiences and opportunities to engage NASA personnel. In collaboration with NASA scientists and education specialists, NSTA delivered six NASA/NSTA Symposia funded by NES in the period between October 1, 2006 and – September 30, 2007:

NES Symposia at Professional Development Conferences	Number of NES Participants
Living and Working in Space: Energy, Baltimore, MD, November 2006	38
The Fragile Ice, Salt Lake City, UT, December 2006	50
Living and Working in Space: Habitat, St. Louis, MO, March 2007	43
The Fragile Ice, St. Louis, MO, March 2007	29
Impact of Polar Climate on Living Systems, St. Louis, MO, March 2007	56
Polar Climates, How Are They Changing?, St. Louis, MO, March 2007	53
Total NES Educators that participated in NES Symposia	269

Eleven web seminars were delivered as follow-up, synchronous events, to the above mentioned Symposia:

NES Symposia Web Seminar Follow-on Professional Development	Number of NES Participants
Living and Working in Space: Energy	64
The Fragile Ice, Salt Lake City	50
Living and Working in Space: Habitat	74
The Fragile Ice	83
Impact of Polar Climate on Living Systems	87
Polar Climates, How Are They Changing?	78
Total number of NES Educators that participated in NES Symposia	436

4. **Summer Workshops** - NASA provides one-week summer training sessions to NES teachers and administrators. During these workshops, NES educators are invited to NASA centers to learn about mission content, technology, and further plan the implementation of the project during the school year.

Orientation Workshops for 07 NES

Workshop Description:

During the first year of the partnership, educators attend a summer orientation workshop hosted by the center that is responsible for project implementation. The core NES team consisting of an administrator and up to four teachers work with AES specialists, NES coordinators, DLN coordinators and NASA scientists and engineers during the workshop. The workshops focused on the needs identified by the team prior to coming to the workshop, development of an action plan, introductions to NASA content, education products, resources, and materials, and the NASA Digital Learning Network. In FY 2007 first-year NES attended the following workshops at centers.

Participants:

2007 NES Orientation Workshops	Number of NES Participants
ARC region NES Orientation Workshop	8
DFRC region NES Orientation Workshop	10
GSFC region NES Orientation Workshop	14
GRC region NES Orientation Workshop	12
JPL region NES Orientation Workshop	8
JSC region NES Orientation Workshop	10
KSC/SSC region NES Orientation Workshop	15
LaRC region NES Orientation Workshop	19
MSFC region NES Orientation Workshop	14
Total NES Educators that participated in Orientation Workshops	110

NEEIS roll-up:

Centers	ARC	DFRC	GSFC	GRC	JPL	JSC	KSC	LARC	MSFC	SSC
Workshop overall	5	5	4.7	4.7	4.8	5	4.5	4.5	5	4.2
Content of the workshop	5	5	4.6	4.8	4.9	4.9	4.5	4.8	5	4.2
NASA facilities	5	5	4.3	3.9	4.6	5	4.8	4.1	5	4.6
NASA staff	5	5	4.7	4.9	5	4.8	4.5	4.9	5	4.8

Participant Feedback:

The NES Project will open doors to opportunities regarding STEM careers for our students. They will be able to speak and interact with those already in the fields that they have not known about or have wondered about.

The AESP and NASA employees were so inspiring. These people obviously love what they do and take great pride in sharing their knowledge with all of us.

This team building opportunity allowed me to get to know members of my staff on an entirely different level. It was so inspiring to see their eyes light up when an activity was presented and they were already thinking about implementation in their classroom.

Content workshops for 06 NES

Robotics

Description:

Introductory workshop in robotics is a mix of practical robotics education materials and lessons, combined with a look at how robots are used to explore the solar system. The program will include robotics design, construction, and programming.

Igniting the Flame of Knowledge: Human Space Flight at Johnson Space Center

Description:

The overarching goal of the workshop was to provide NES teachers with ideas, experiences and NASA resources to help them teach STEM concepts in ways that would excite and engage their students. A central theme of human space flight, with a particular focus on the STS-118 mission, was chosen as the hub around which to attach content. NES goals and outcomes were factored into outcomes and assessments.

Technology Immersion at Langley Research Center

Description:

The technology Immersion content workshop exposes NES teachers to several current educational technology tools and helps them integrate the ones they feel most comfortable in their educational program. Teachers investigated the potential instructional benefits and limitations of PDA's, probeware, robotics, videoconferencing and video editing while integrating them into NASA content.

NES Math Content Workshop at NASA Glenn Research Center

Description:

The workshop answered the question "How NASA Applies Mathematics for Mission Success?" During the workshop, educators discovered exciting and creative ways to engage students through learning about the mathematics behind NASA science and research. NASA experts facilitated hands-on and interactive group activities, which equipped educators to increase student understanding about problem solving, measurement, data analysis, and probability.

Participants:

NES Content Workshop	Number of NES Participants
Robotics at JPL	19
Igniting the Flame of Knowledge: Human Space Flight at JSC	23 NES and 3 Delta Research Schools (DRS) - Dutch
Technology Immersion at LaRC	21
NES Math Content Workshop at NASA GRC	23
Total of NES Educators that participated in Content Workshops	86 NES and 3 DRS

NEEIS Roll-up:

Workshops	Math	Human Space Flight	Technology	Robotics
Workshop overall	4.5	5	4.8	4.9
Content of the workshop	4.6	5	4.6	4.9
NASA Facilities	4.3	5	4.3	4.9
NASA Staff	4.6	5	5	4.9

Sustainability Workshop for 05 NES

National Partnership and Sustainability Workshop at United States Space and Rocket Center

Description:

In 2005, NASA established 50 NES partnerships with school teams from diverse communities across the country. NES Teams have focused their efforts on building STEM-G resource knowledge, enhancing family involvement, increasing their use of inquiry instruction, increasing their use instructional technology, and integrating these components into their school improvement plans. As these NES Sites prepare to begin the final year of the partnership, representatives from each Site have been invited to participate in the NES Sustainability and Partnership Conference. During the conference, NES Teams will learn best practices in partnership building and strategies for sustaining the NES project at their schools beyond the three years of the partnership.

Participants:

NES Sustainability and Partnership Workshop
Number of NES Participants: 144

NEEIS Roll-up:

Workshops	Partnership/ Sustainability
Workshop overall	4.3
Content of the workshop	4.4
NASA Facilities	4.6
NASA Staff	4.8

Special Opportunity Professional Development Workshops

Reduced Gravity Flight Opportunity

Description:

The NES Reduced Gravity Flight Opportunity provides a unique experience for NES students and teachers to propose, design, fabricate, fly and evaluate a reduced gravity investigation of their choice over the course of approximately four months. The overall

experience includes scientific research, hands-on investigational design, test operations and educational/public outreach activities. NES investigations will adhere to the same processes and procedures governing NASA research and test flights so that NES students and teachers gain insight into the workings of NASA and ensure participant and investigation safety guidelines are followed.

Launch Quest

Description:

Launch Quest is the first venture of its kind: a partnership between the Connecticut Center for Advanced Technology, Inc. and its National Aerospace Leadership Initiative (NALI), and UP Aerospace, a CT-based company in the new frontier of commercial space flight. This unique partnership provides students with the opportunity to see how scientific discovery and entrepreneurship go hand-in-hand.

Launch Quest student teams from around the country design and develop experiments that fly into space on a 20' sub-orbital sounding rocket, with a flight profile of approximately 70 miles and five minutes of microgravity time. Launch Quest students study the physics and mathematics used in rocketry and aerospace, and the properties materials must have to endure the rigors of flight. The opportunity inspires interest in the aerospace field through an exciting hands-on application of advanced science, technology, engineering and math.

Winter Story

Description:

As NASA pursues answers to the fundamental question, "How is Earth changing and what are the consequences for life on Earth" NASA scientists collect and analyze planetary data from space and on the surface. As the Agency seeks to understand the complex Earth system, several focus areas for understanding this complex system have been established. Climate variability and change, atmospheric composition, water and energy cycle, and weather are areas for study. NASA's study of Earth systems is tied closely to its goal to "Identify the habitable zones in the solar system." The compelling context of Earth system science presents opportunities for engaging educators in the process of scientific inquiry, helping them communicate science, technology, engineering and mathematics (also known as STEM) content while developing a deeper understanding of the complexities of the Earth system. The Agency is committed to the development of innovative methods for communicating with science teachers. The Winter's Story Program at Yellowstone National Park provides a unique venue for helping teachers understand the role of the cryosphere on the Earth system and provides a context for delivery of compelling content to their students.

Spaceward Bound

Description:

Spaceward Bound is an educational opportunity organized at NASA Ames in partnership with The Mars Society, and funded by the Exploration Systems Mission Directorate (ESMD) at NASA Headquarters. The focus of Spaceward Bound is to train the next generation of space explorers by having students and teachers participate in the exploration of scientifically interesting but remote and extreme environments on Earth as analogs for human exploration of the Moon and Mars. One part of the opportunity involves teachers in authentic fieldwork so that they can bring that experience back to their classrooms and assist in the development of curriculum related to human exploration of remote and extreme environments

GEMS - Great Explorations in Mathematics and Science

Description:

GEMS is a program from the Lawrence Hall of Science which offers professional development and educational guides in math and science. NES educators had the opportunity to participate in their professional development workshop.

VISIONNES

Description:

The VISIONES Summer Institute 2007 is a professional development event offered for NES educators. Held in San Diego, California, on June 15 – 21, 2007, the event will provide 40 hours of professional development for NES teachers on how to use geographic information systems (GIS) in K-12 education settings. Teachers attending VSI 2007 will divide their time between hands-on workshops conducted by experienced trainers from the Center for Image Processing in Education (CIPE) and events at the ESRI Education User Conference (EDUC). At VSI 2007, teachers will learn how to guide students through the process of geographic thinking, collect geo-referenced data about a study site, employ ArcView9.1 to analyze geographic information, and apply the results of their analysis to educate themselves and the public, make decisions and solve problems.

Leadership Conference for NES Administrators

Description

During the academy, team administrators focus on NASA scientific processes and how they model, mirror and reflect the educational inquiry process. Administrators shadow a NASA career researcher to observe how they handle challenges, inquiry, design issues and problem solving. NES project goals, tools for implementation and the administrator's critical roll of supporting the NES team us also addressed. Evaluation and sustainability will be addressed since they are critical factors for a NES school.

Participants:

NES Special Opportunity Professional Development Workshop	Number of NES Participants
Reduced Gravity Opportunity	71
Launch Quest	16 NES; 3 Delta Researcher Schools (DRS) - Dutch
Winter Story	23 NES; 2 DRS - Dutch
Spaceward Bound	8
GEMS	12
VISIONNES	23
Leadership Conference for NES Administrators	15
Total of NES Educators that participated in Special Opportunity Workshops	168 NES and 5 DRS-Dutch

Student Opportunities

Exploring Space Challenges- NASA Exploring Space Challenges provides a compilation of investigations and design challenges for all grade levels in primary and

secondary schools. In FY 2007 Exploring Space Challenges offered the following opportunities to students:

Exploring Space Challenge	Number of Participants
<u>Mission: Moon Math</u> Students work in teams to design, build and conduct a moon experiment	229 students from 9 schools
<u>Mission: Fuel Your Imagination</u> Students write a fictional story that incorporates science and math	15 submissions from 10 schools
<u>Mission: Lights Camera Action!</u> Students make a video about their experience as an NES school	6 schools participated
<u>Mission: Name the International Space Station Node 2</u> Students were challenged to research Node 2, select a name for the node and write an essay explaining their choice	55 schools participated
<u>Teacher Challenge – Hurricanes!</u> Teachers were challenged to design an innovative lesson about hurricanes.	21 teacher submissions
<u>Mission: Design a Lunar Base</u> Students acted as design systems specialists to support living and working on the Moon	2 schools participated
Total schools that participated in challenges:	103 schools

Educational Technology

NASA developed cutting edge educational technology tools to engage NES students in NASA research and mission content. NES Educational Technology efforts can be used to address **PART Measure 10:** Number of people reached via e-education technologies per dollar invested.

NES website usage - The NES website is an online resource and collaborative tools for NES educators. The NES website is a central repository for all NES applications, forms, information, resources, and the school technology budgets. The NES website has links to other NASA Educational Projects and the online NES application.

NES Website Access Level	Number/Type
NES Website Homepage	876,245 page views in FY07; average of 2,385 per day
School Teams (Password Restricted)	10,248 log-ins in FY07
NASA Personnel (Password Restricted)	1,211 log-ins in FY07
Total usage of the NES Website	887,704

Digital Learning Network

One of the primary delivery mechanisms of NASA content to students in NASA Explorer Schools is through the Digital Learning Network (DLN). NASA Explorer Schools have

(or purchase) equipment with two-way interactive videoconferencing capabilities that allow them to connect with any of the 10 NASA field centers, NASA partners, and NASA contractors to interact with scientists, engineers, educators, or content experts. DLN modules are designed with pre- and post activities and are developed around NASA mission content and the NES Needs Assessments. DLN focuses content delivery on NES schools, but also provides free videoconferencing to other formal and informal education institutions across the country. Below are DLN statistics for FY 2007:

- 75% audience increase from 06 to 07 for all schools, 62% increase in number of events
- 95% audience increase from 06 to 07 for NES, 82% increase in number of events

Summary of DLN events:

Event Data	All Schools FY06	NES FY06	All Schools FY07	NES FY07
Total DLN Events Completed	1583	304	2570	556
Student Participants	50199	10807	92851	23767
Educator Participants	11003	2288	1403	2205
Other Participants	3302	1265	5877	1843
Total Participants	65050	14402	113872	28052

Student Observation Network

The ***Student Observation Network was visited 31,895*** times in FY07. The Star Count activity was developed to provide an education activity supported by STS-115. The Website went live on August 26, 2006, just a couple of weeks before the launch of STS-115. During FY07, the ***Star Count Website was visited 31,558 times***. During the month of September the Website was visited 14,641 times.

In support of STS-118, the Student Observation Network: Habitat modules went live on the NASA portal during the 07-08 FY. The SON: Habitat module is a problem-based learning activity requiring students to propose and defend a design for a research habitat on the moon or Mars. Students explore eco systems, human nutrition and fitness, recycling of air and water, and waste removal. The engagement activity, The Sealed Room, sets the stage for the activity and addresses student knowledge gaps and misconceptions. New modules will be added to the Website as they become available. Approved NASA products that relate to the topic will be linked to.

In support of STS-118, the Student Observation Network: Energy Website went live on the NASA portal during the 07-08 FY. The Solar Energy for Space Exploration module is a problem-based learning activity that motivate students to master core science and math standards. Students learn about the sun, energy, energy transformation and electrical circuits as they confront problems about supplying energy for space exploration. New modules will be added to the Website as they become available. Links to approved NASA products that relate to the topic will be added.

US Satellite Short Courses

Participant numbers listed below, indicate the number of NES educators, educators that applied to NES but didn't get into the project, and NEAT.

Short Course Title	Number of Participants
Signals of Spring	27
Signals of Spring - Marine Animals	11
Mathematics Achievement and WDLC	24
AstroVenture	31
Lessons from the Oceans	30
Tracking a Solar Storm	13
Mars Detectives	39
Total Participation in Short Courses	175

Teachers Supporting Teachers

Mentor Schools: The Mentor School pilot developed a partnership between schools to facilitate a smooth transition for new NES, and to provide a sustainability opportunity for experienced schools. Six schools participated in the Mentor Schools pilot in FY07:

- Marcelino Canino Canino (2005) and Charles H. Emanuel (2006)
- Phenix City Intermediate (2003) and Tuskegee Public Elementary (2006)
- Falconer-Chapman (2003) and Vernon School (2006)

Highlights:

- Every Teacher at Tuskegee (3 groups) visited Phenix City
- Phenix City teachers visited Tuskegee to provide professional development
- Phenix City facilitate a partnership between the Coca-cola Science Center and Tuskegee, that resulted in the science center providing activities/professional development
- Email and telephone conversations between Emanuel and Marcelino
- Planned trip to Virgin Islands by Marcelino team lead
- Marcelino and Emanuel both chose to participate in RCTs and have collaborated on participating and how to best execute the project

NES Educators' presented at conferences:

NES provided conference presentation support funds to NES educators who were selected to present STEM educational activities at professional educator conferences. In FY07, NES supported 14 educators selected as conference presenters:

NES	Conference	Presentation
Gainesville Exploration Academy	Georgia Science Teachers Association	Imagine Mars
Jardine Diversified	Kansas Association of Teachers of Science	KATS KAMP 2007
Conyers Middle School	National Schools to Watch	A Catalyst in Science Reform
Baker Middle School	NSTA St Louis	Baker Middle School: NASA Explorer Schools at Work
Sci-Port/Broadmoor	NSTA St Louis	Getting Jazzed About Mercury
Biddeford Middle	NSTA St Louis	Investigating Sun-Earth Connections
Fort Worth ISD	NSTA St Louis	Make Science a Family Affair: Successful Family Science Nights
Pender Public School	NSTA St Louis	Make Science a Family Affair: Successful Family Science Nights
Broughal Middle	NSTA St Louis	Middle School Science and University Engineering: A Cooperative Learning Program
Kilmer Elementary School	NSTA St Louis	NASA Explorer Schools Science Lessons that Will Inspire Your Students to Read!
Kate Waller Barret Elementary	NECC Atlanta	School portfolios support reflection, networking and evaluation
Greencastle-Antrim High	NSTA St Louis	Science Sisters: Literacy, Inquiry, and Mentoring
Stewart Middle Magnet	NSTA St Louis	Unlocking Earth's Secrets from Space
Gainesville Exploration Academy	Georgia Science Teachers Association	Imagine Mars

Supporting Agency Efforts

Highlights of STS-118 Support:

NES Educators were provided with information about the STS-118 Mission and Educational Resources via weekly e-blast, presentations at summer workshops, and direct communication from AES and NES Coordinators. NES Educators have been asked to register for express mail and have been invited to participate in the pennant design challenge, engineering design challenge and the physical fitness challenge. Educational materials including posters and lithographs were distributed to NES.

13 educators from NES attended the STS-118 Launch Conference and Launch.

NES Participation in Educational Flight Projects:

Type of Event	NES Information	Number of Participants
EarthKAM	14 NES from across the country	495 participants
ISS Downlink	Robert L. Ford K-8 School Lynn, MA August 19	2,995 participants (please note that the downlink was cancelled at the last minute, so the participants videoconference with astronauts Bill McArthur and Joe Acaba)
ISS Downlink	Collier County Schools Naples, FL September 4	140,218 participants
ARISS Event	Kenneth J. Carberry Intermediate School Emmett, Idaho May 16, 2007	On-site participation - 460 students, teachers and parents Remote Ham Radio participation - 2,000 students in some 30 schools across the Treasure Valley, Mountain Home, Cascade and McCall
ARISS Event	Toyon Elementary School San Jose, CA May 21, 2007	On-site participation 262 students, teachers and parents; Remote Ham Radio participation: 220 participants
ARISS Event	Mitchell Elementary School Ann Arbor, MI September 17, 2007	On-site participation - 255 students, parents and teachers, Remote Intranet participation: 5 participants
Total NES Participation in Educational Flight Projects:		146,910

NES Educators and Students attended Launches:

Launch	Number of NES	Number of Teachers	Number of Students
STS-115	6	106	317
STS-116	2	103	27
STS-118	6	13	0
Total Participation:	14	222	344

NES Student Symposium

The NES Student Symposium was canceled due to budget reductions. Eight NASA Centers hosted Virtual Student Symposia via the Digital Learning Network, or regional Student Symposia at their Center:

Center	Type of Event	Number of NES that participated
ARC	Combination (Live and DLN)	3 schools DLN; 2 schools at ARC
GRC	Two DLN Events	7 schools
JPL/DFRC	Live at JPL	5 schools
JSC	Two DLN Events	3 schools
KSC	Two DLN Events	6 schools
LaRC	One DLN Event	2 schools
MSFC	Two DLN Events	2 schools
SSC	Live at SSC	3 schools
Total number of NES that participated		33

Partnerships for Sustainability

The NES Project addresses the evaluation operating principal and **PART Measure 12**, (Percentage of programs that have developed and annually measure their effectiveness using performance metrics relating to NASA's mission and education goals) through a mixed method evaluation approach.

It is essential that NES schools are able to continue their systemic reform efforts beyond NASA seed funding. NES have leveraged partners at a local, state, regional and national level for financial and in-kind contributions to continue the goals outlined in their action plans. The **NES Partnerships for Sustainability Model** works on the national, state, and local levels to assist schools connect with STEM stakeholders and build partnerships that will sustain the NES projects at their school beyond the initial three-year funded partnership with NASA.

The NES Partnerships for Sustainability Model provides NES teams with tools to leverage local, state, and national resources to sustain their efforts beyond the three-year partnership with NASA. NES Sites are provided with a partnership building manual: ***"NES Guide to Developing Partnerships and Sustainability: Utilizing a Systems Approach,"*** which was specially developed for use in NES by Paragon TEC, in FY07. The manual outlines seven-steps for building successful partnerships:

1. Developing an Annual Partnership and Sustainability Plan
2. Identifying and Researching Potential Partners
3. Developing and Communicating Partnership Vision, Goals, and Objectives
4. Building Relationships with Potential Partners
5. Managing Partnership Agreements
6. Documenting Partnership Contributions and Assessing Partnership Impact
7. Monitoring, Evaluating, and Formally Recognizing Partnership Successes